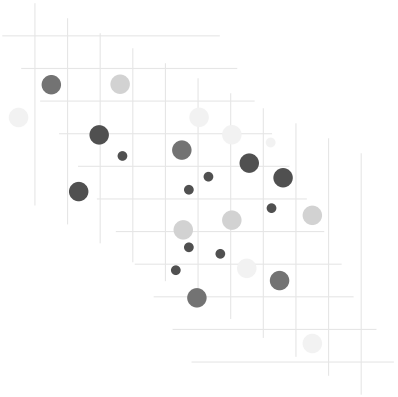
Global Economic Performance Report

20/02/2024

Prepared for World Bank Development Indicators Sector



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Executive Summary

This report provides a comprehensive analysis of the profound impact technology has had on the global economy, traced through four pivotal stages: the Foundations, the Digital Leap, the Age of Connectivity, and Advanced Technologies and Sustainability. By examining historical GDP per capita growth data, we illustrate the tangible effects of technological advancements on economic development.

The report delves into significant technological milestones, with a particular focus on recent developments in Artificial Intelligence (AI) and the gig economy. These sectors, emblematic of the current era's innovation, serve as critical indicators for projecting future economic trends. Their recent nature and rapid evolution provide a solid basis for forecasting, offering insights into how technology will continue to shape economic landscapes.

A comparative analysis of countries reveals a clear dichotomy between those that are technologically advanced and those that lag behind. This division underscores the pervasive digital divide, highlighting disparities in access to technology and the varying capacities of nations to leverage it for economic growth.

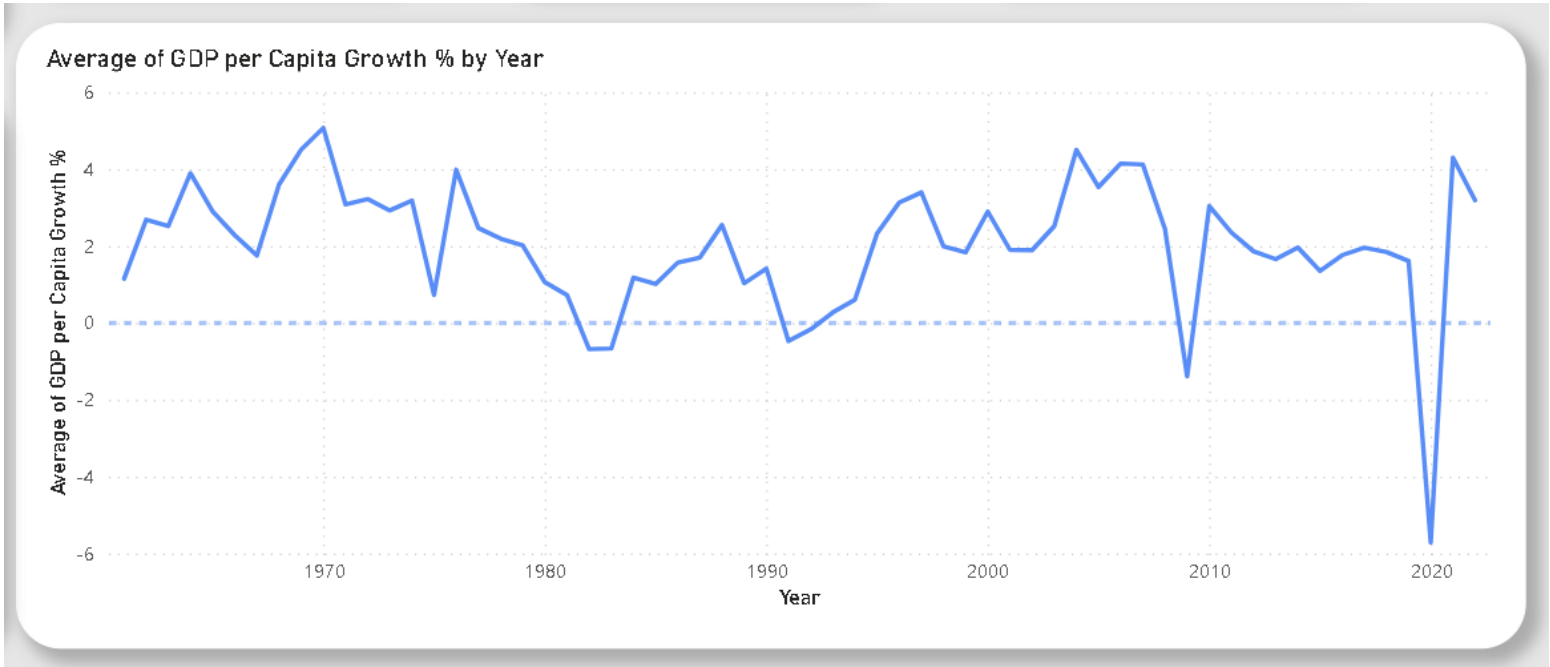
Utilizing forecast line charts, we have predicted future economic trajectories, emphasizing the increasing significance of technology in driving GDP growth. The report identifies the digital divide as a crucial factor that could influence future economic equality and development.

Introduction

This report explores how technology has rapidly grown and changed the world's economy. Technology's growth is incredibly fast, meaning new inventions are quickly followed by even newer ones, each improving on the last. This fast-paced change has helped businesses become more efficient and has led to the creation of new types of jobs and industries that didn't exist before.

From the early days of computers to today's internet and artificial intelligence, technology has continually pushed the economy forward. It has made some businesses more successful while challenging others to adapt or fall behind.

In this report, we'll look at the journey of technology through four key stages: the early beginnings, the rise of the internet, the spread of smartphones and online services, and the latest advancements like AI. We'll see how these changes have helped economies grow and what they mean for the future.



A look at the global economy since 1961 until 2022

Methodology

In our examination of the impact of technological advancements on economic growth, we employed a comprehensive dataset sourced from the World Development Indicators. The most recent update to this dataset was on July 25, 2023, which has allowed us to incorporate the latest available data into our analysis.

Data Preparation and Analysis

To ensure our analysis was both precise and relevant, we utilized Power Query for data filtering. This process involved a meticulous selection and refinement of data points to align with our research focus on technology's role in shaping economic trends. A key step in our data preparation was "unpivoting" the data. This technique transformed our dataset from a wide format, which is less conducive to analysis, to a long format. By unpivoting the data, we were able to create more effective line charts and conduct detailed forecasts, enhancing our ability to visualize trends over time and predict future economic trajectories.

Interactive Dashboards

Recognizing the complexity of economic data and the diverse interests of our readers, we have developed interactive dashboards. These tools allow users to explore the data beyond the scope of this report, offering a hands-on approach to analyzing the intricate relationship between technology and economic development. The dashboards are designed to facilitate deeper insights and personalized exploration of how technology impacts various aspects of the global economy.

Consideration of External Factors

It is crucial to acknowledge that while technology plays a significant role in economic trends, it is not the sole influencing factor. External elements such as global events and economic policies also significantly impact economic outcomes. Notably, the coronavirus pandemic has had a profound global effect, indiscriminately affecting economies worldwide. Our analysis takes into account these external variables, understanding that they contribute to the broader economic landscape within which technological advancements operate.

Technology throughout history

1960s

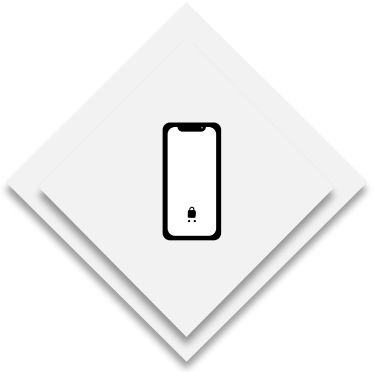
Computer Revolution

The birth of personal computing, making technology accessible to businesses and setting the stage for future innovations. Advances in global communication via satellites and early mobile networks,

1980s

The Digital Leap

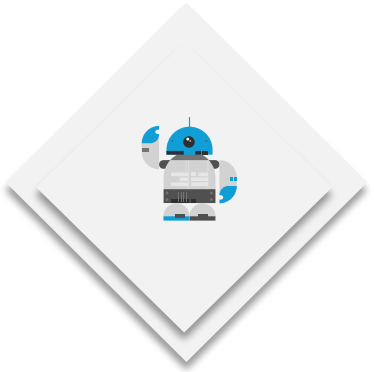
The launch of the Web transformed information access and connectivity, revolutionizing global communication. Evolution from bulky, limited devices to essential tools for personal and business communication, laying the groundwork for future mobile technologies.



2000s

The Age of Connectivity

Widespread adoption of high-speed internet and mobile connectivity, fueling the rise of digital content, e-commerce, and social media. The introduction of smartphones and app stores, turning mobile phones into versatile computing devices that influence every aspect of daily life.



2020s

Advanced Technology

Integration of AI and big data analytics into various sectors, enhancing decision-making, automation, and personalization. The emergence of blockchain offering secure, transparent transactions and the foundation for cryptocurrencies. The rise of freelance and on-demand services, reshaping labor markets and employment models.

60s and 70s – The Foundations

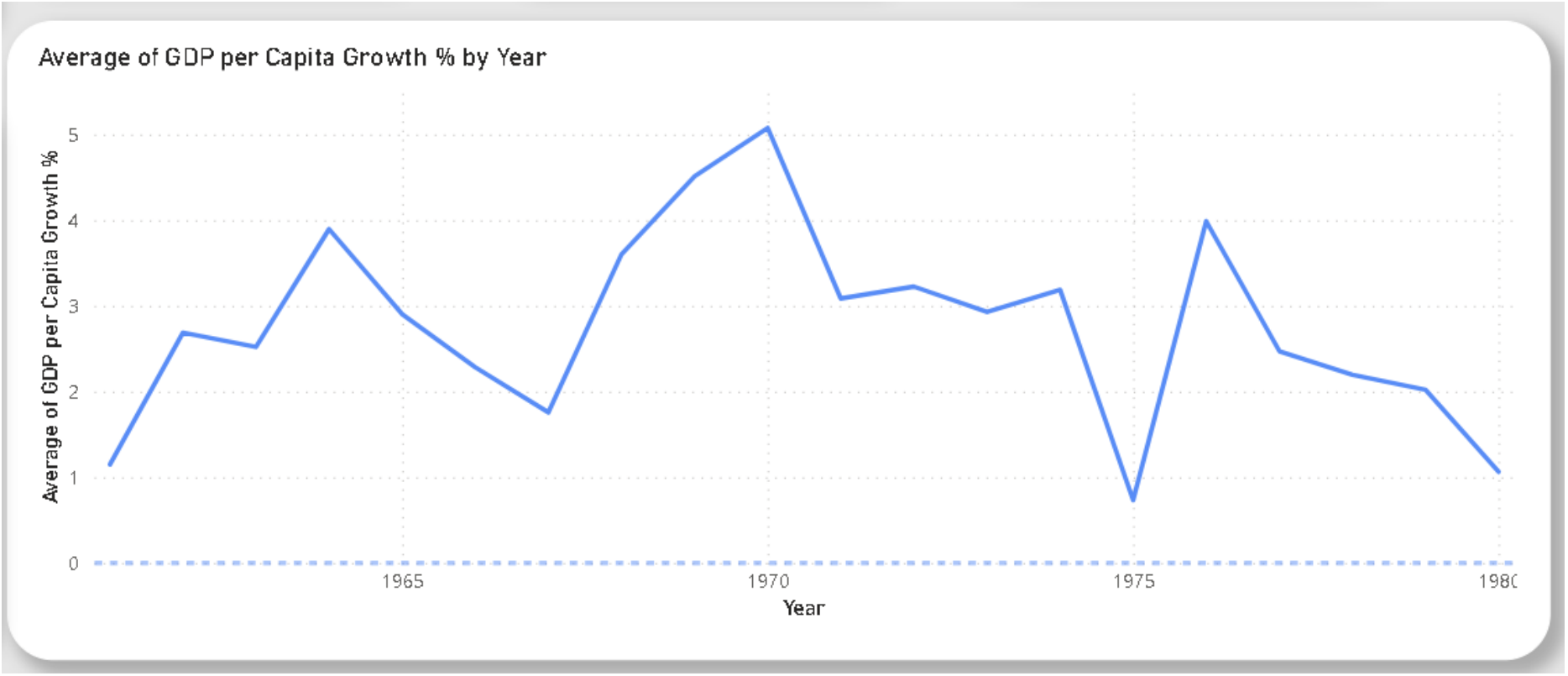
Computer Revolution

The development of the first personal computers and the introduction of the microprocessor transformed business operations and productivity. Companies began automating processes that were previously manual, leading to significant increases in efficiency and reductions in cost. This automation extended across industries, from manufacturing to financial services, fundamentally changing the nature of work and economic output. The computer revolution also spurred the growth of the software industry, creating a new sector in the economy dedicated to developing applications for business and personal use.

Telecommunications

The advancements in telecommunications, particularly the establishment of global satellite communications and the early development of mobile telephony, had profound economic implications. They made it possible for information to be shared across the globe almost instantaneously, facilitating international business and finance. This era saw the beginning of the globalization of the economy, as companies could more easily operate across borders, access new markets, and manage operations in multiple countries. The ability to communicate quickly and reliably also supported the growth of international trade, as logistics and coordination could be managed in real-time.

Overall, the Foundations stage set the scene for a more connected and automated world. The innovations in computing and telecommunications during this period not only spawned new industries and job categories but also enhanced productivity and global economic integration. These developments laid the essential infrastructure for the digital age, enabling the rapid technological progress and economic transformations that followed in the subsequent decades.



The line chart above shows the Average GDP per capita growth by year between 1961 and 1980. The first personal computer was invented in 1975. The average GDP per capita growth % in this timeframe was 1.69%.

80s and 90s – The Digital Leap

The Digital Leap era, spanning the 80s and 90s, marked a significant transformation in the global economy through the advent of the Internet and World Wide Web, along with the proliferation of mobile phones. This period catalyzed the shift towards a digital, interconnected global marketplace, fundamentally altering how businesses operate and how consumers engage with content, services, and each other.

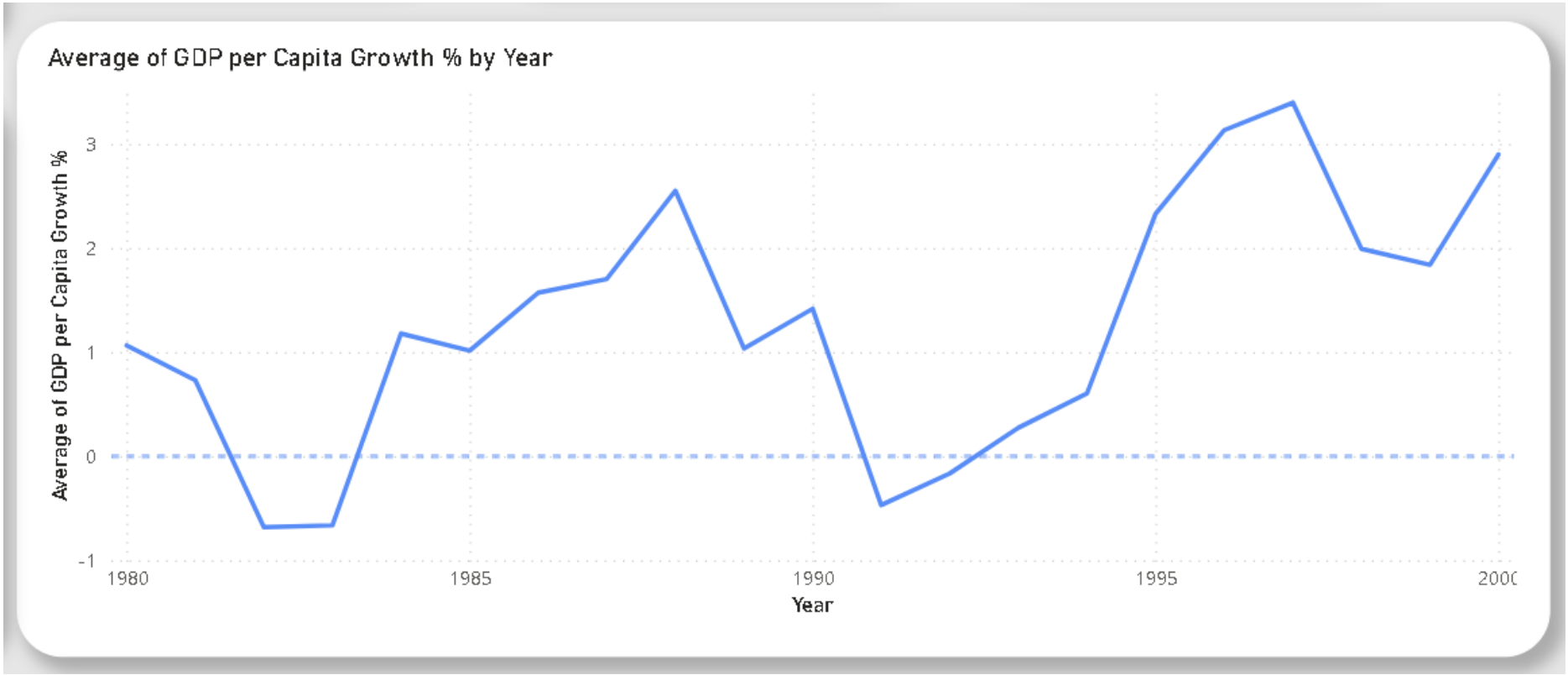
Internet and World Wide Web

The introduction of the Internet and the World Wide Web democratized access to information, removed geographical barriers to business, and fostered a new era of global communication and commerce. Businesses could reach customers worldwide with lower overheads than traditional brick-and-mortar operations, giving rise to e-commerce and digital marketing. This period also saw the emergence of online services and platforms that became integral to both personal and professional life. The global economy expanded as markets became more accessible, supply chains more interconnected, and business operations more efficient.

Mobile Phones

During this period, mobile phones evolved from luxury items to essential tools for communication, enhancing personal connectivity and productivity. This evolution paved the way for new business models and services, including mobile banking, SMS marketing, and later, app-based services. The mobility offered by these devices meant that consumers could access information and services on the go, changing consumption patterns and expectations. The telecommunications industry boomed, with mobile networks expanding rapidly to meet growing demand, driving significant economic growth in the tech sector and beyond.

The Digital Leap fundamentally changed the landscape of the global economy by fostering new industries, transforming consumer behavior, and creating unprecedented opportunities for innovation and growth. It laid the groundwork for the digital-centric economic models of the 21st century, highlighting the critical role of technology in economic development and transformation.



The number of websites grew from 130 in 1993 to over 100,000 at the start of 1996. By 1995 the internet and the World Wide Web were established phenomena. We can see that the line chart peaks in 1996, this is where businesses are co-operating internet services into their business operations. The average GDP per capita by growth in this timeframe is 0.9%.

2000s – The Age of Connectivity

The 2000s, characterized as The Age of Connectivity, witnessed the exponential growth of broadband and mobile internet access, alongside the advent of smartphones and apps. This era significantly transformed economic structures, consumer behavior, and the global marketplace.

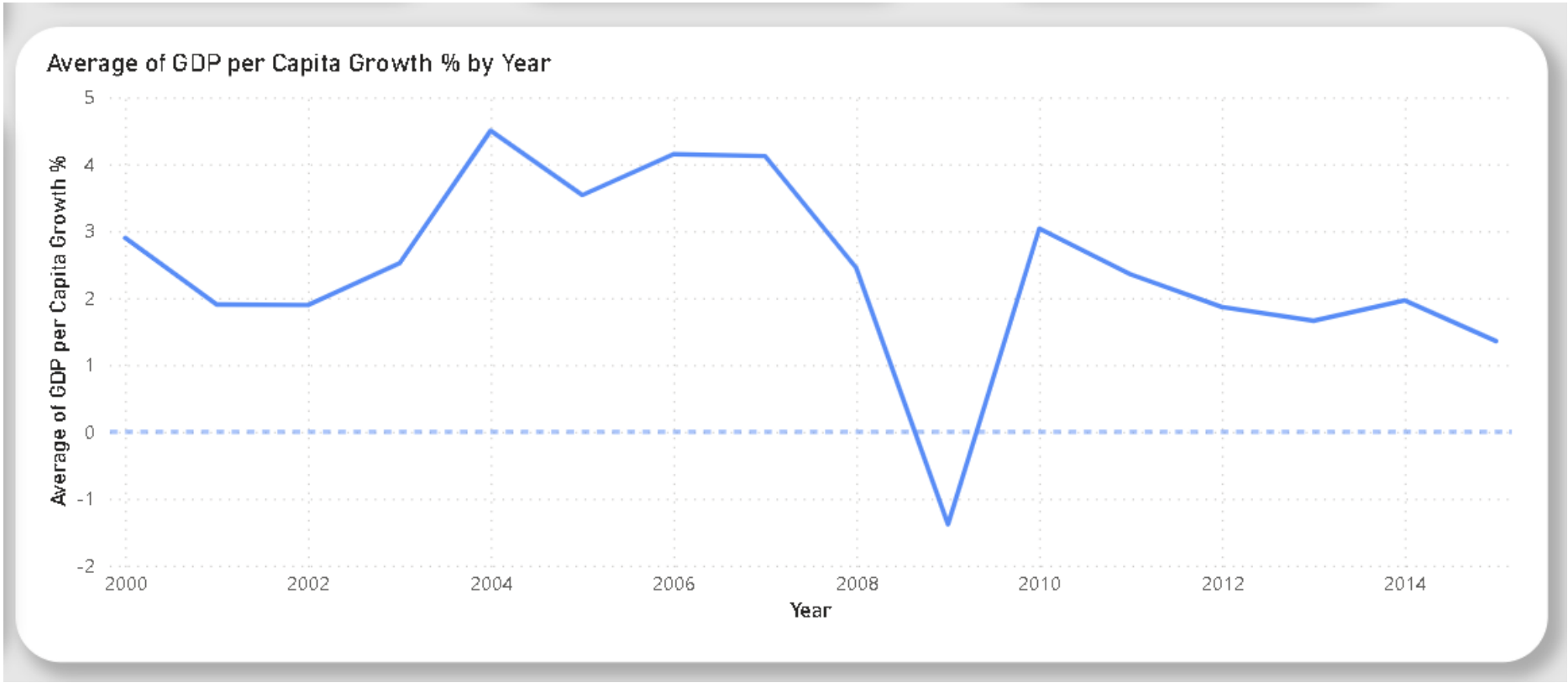
Broadband and Mobile Internet

The widespread adoption of broadband and mobile internet marked a pivotal shift towards an always-connected society. This connectivity facilitated the emergence and growth of e-commerce, enabling businesses to operate online with greater reach and efficiency. It also spawned the birth of social media platforms, which transformed marketing strategies by allowing direct engagement with consumers. The era saw a significant increase in digital content consumption, leading to the rise of digital media, online advertising, and streaming services. For the economy, this meant the creation of new jobs in digital marketing, content creation, and IT services, as well as a more dynamic and competitive marketplace.

Smartphones and Apps

The introduction of smartphones and the development of app ecosystems revolutionized personal computing and mobile communication. Smartphones became essential tools for personal and professional use, encapsulating the functions of a computer, camera, and telephone in a single device. The app economy burgeoned, fostering innovation and entrepreneurship by providing a platform for developers to create and market new applications, generating a significant number of jobs and contributing to economic growth. Businesses across industries adopted mobile strategies to reach consumers more effectively, enhancing customer service and operational efficiency. This period also saw the rise of the mobile payments and fintech industries, simplifying transactions and financial services for consumers and businesses alike.

The Age of Connectivity drove significant economic growth and innovation, catalyzing the transition to a digital economy. It reshaped consumer expectations towards instant access and convenience, spurred the digital transformation of traditional industries, and laid the foundation for the next wave of technological advancements. The changes brought about in the 2000s have had lasting impacts, setting the stage for further innovations in technology and business models in the following decades.



Smartphones were released in the late 2000s however due to the 2008 recession, GDP growth has been held at a standstill. The average GDP per capita growth here is -0.79%.

2020s – Advanced Technologies and Sustainability

The 2010s to the present have been marked by Advanced Technologies and Sustainability, a period characterized by the integration of artificial intelligence (AI) and big data, the proliferation of blockchain technology, significant advancements in renewable energy technologies, and the rise of the gig economy. These developments have further transformed the global economy, driving efficiency, innovation, and addressing some of the critical challenges of our time.

AI and Big Data

The integration of AI and big data into various sectors has revolutionized how businesses operate and make decisions. AI has enabled the automation of complex processes, from manufacturing to customer service, enhancing productivity and innovation. Big data analytics has provided businesses with unprecedented insights into consumer behavior, market trends, and operational efficiency, driving targeted marketing, product development, and strategic planning. This era has seen the rise of personalized services, predictive maintenance, and AI-driven innovations, contributing to economic growth, and creating new job categories in data science and AI development.

Blockchain Technology

Initially associated with cryptocurrencies like Bitcoin, blockchain technology has found applications across various industries, offering secure, transparent, and decentralized transaction mechanisms. This technology has the potential to transform financial services, supply chain management, and digital identity verification, among other areas, by reducing fraud, enhancing efficiency, and lowering transaction costs. The economic impact includes the creation of new business models, such as decentralized finance (DeFi) platforms, and opportunities for innovation in sectors where trust and security are paramount.

Renewable Energy Technologies

The push towards sustainability has accelerated the development and adoption of renewable energy technologies, including solar, wind, and hydroelectric power. These technologies are central to addressing climate change and have become increasingly cost-competitive with traditional fossil fuels, driving investment and job creation in the green economy. The transition to renewable energy sources is reshaping energy markets, promoting energy independence, and stimulating economic development in regions investing in these clean technologies.

Gig Economy

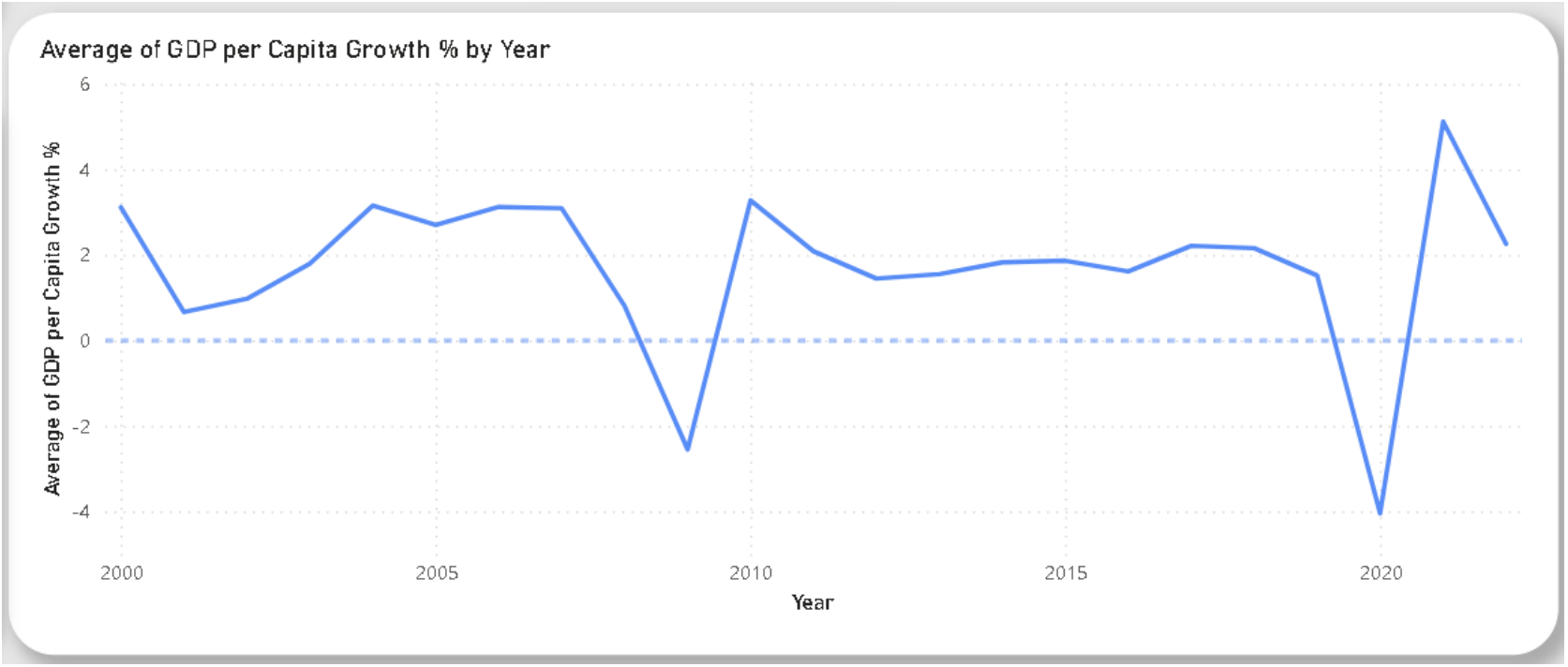
The expansion of the gig economy, facilitated by digital platforms connecting freelancers with short-term work opportunities, has reshaped labor markets and employment models. This shift offers flexibility for workers and access to a global talent pool for businesses but also raises questions about job security and benefits. The gig economy reflects broader changes in the workforce and economy, emphasizing the need for policies and practices that balance flexibility with worker protections.

From the 2010s to the present, these advancements have not only spurred economic growth and efficiency but also presented challenges, including ethical considerations around AI, regulatory issues surrounding blockchain, the transition to sustainable economic practices, and the rights of gig workers. The cumulative effect of these developments is a more interconnected, innovative, and resilient global economy that is increasingly focused on sustainability and digital transformation.

Major technology advancements

Major technology advancements throughout history such as innovation and new products have a change on the type of skills firms demand. Firms which are technology based demand different skills than others. New technology advancement may also change the way people work and the future organisation of work. We can be quite sure that innovation will also create jobs in the future, but they will be in other occupations as the jobs destroyed by technology

Technology tends to favour some particular skills, while devaluates other skills and makes them redundant, This is called **Skill-Biased Technological Change'.** Unemployment is particularly high among people with primary and lower secondary education or less. This can be a problem for many countries who do not have a strong connection with advanced technology and a low percentage of educated population. With a high percentage of skill displacement, there is a direct relationship with productivity, which decreases the GDP per capita.



This graph above represents the GDP per capita growth in percentage across the globe. We can see that after the recovery of the 2008 recession, there has been dip in 2012 – 2013. Now this may be due to unemployment rates being high because of the spike in technology advancements. The technologies released in 2013, particularly Google Glass, PlayStation 4, Xbox One, and the Oculus Rift Development Kit, indirectly influenced employment rates in several ways, primarily through the creation of new job opportunities and the transformation of existing roles. While Google Glass itself did not achieve mass consumer adoption, it spurred interest and investment in wearable technology. This led to the development of new products and applications in health, fitness, industrial applications, and augmented reality (AR), creating jobs in software development, product design, marketing, and sales within these niches. Additionally, it fostered a need for specialists in user experience (UX) design and privacy regulation, given the unique challenges of wearable tech. The release of these gaming consoles significantly boosted the video game industry, leading to increased demand for game developers, graphic designers, animators, and sound engineers. The consoles' emphasis on online multiplayer experiences and digital downloads also created jobs in network infrastructure, cybersecurity, and digital commerce. Furthermore, the success of these platforms contributed to the expansion of the esports industry, which has created roles in event management, broadcasting, and marketing. As a pioneering product in the resurgence of virtual reality, the Oculus Rift Development Kit catalyzed interest in VR technology. This interest led to job creation in VR content creation, application development, and hardware engineering. Beyond gaming, VR technology began to be applied in training simulations for medical, aviation, and military applications, as well as in architecture and real estate, thus broadening the range of employment opportunities related to VR.

The indirect impact of these technologies on employment rates can be seen in the expansion of the tech sector and related industries. By fostering new markets and services, they contributed to economic growth and diversification, which in turn supported job creation. While it's challenging to quantify their direct impact on overall employment rates, these innovations undoubtedly played a role in shaping labor market trends, particularly in technology-focused roles and industries. The development and adoption of new technologies typically lead to a shift in the labor market, where demand increases for new skills and expertise, highlighting the importance of adaptability and continuous learning in the workforce.

While technological advancements such as those introduced in 2013 often lead to job creation and economic growth in certain sectors, they can also contribute to increased unemployment rates in some areas, particularly through mechanisms like automation, skill mismatches, and industry transformation. Here's how these effects can manifest

Technologies that automate tasks previously performed by humans can lead to job displacement, especially in manufacturing, customer service, and administrative roles. For instance, advancements in AI and machine learning can automate complex tasks, reducing the need for human labor in certain processes.

While efficiency gains from technology are generally positive for the economy, they can initially lead to unemployment in sectors where human labor is directly replaced by machines or software. This effect can be more pronounced in regions heavily reliant on industries vulnerable to automation.

Rapid technological changes can create a gap between the skills required by employers and those possessed by the workforce, leading to structural unemployment. Workers displaced by new technologies may find it challenging to re-enter the job market without significant retraining or upskilling.

The benefits of technological advancements are not evenly distributed geographically. Regions with a strong focus on technology and innovation, such as Silicon Valley in the United States, may thrive, while areas with economies dependent on traditional industries may struggle to adapt, leading to higher unemployment rates in those regions.

Technology enables businesses to operate globally, increasing competition. Companies in developed economies might outsource jobs to regions with lower labor costs, affecting employment in their home countries.

The creation of jobs may still be outweighed by the loss of jobs after the technology spikes which took place in 2013. However, we must consider that there are always external factors that will affect GDP per capita.

Gig Economy

The gig economy refers to a labor market characterized by the prevalence of short-term contracts or freelance work as opposed to permanent jobs. In the gig economy, workers are often considered independent contractors, and they engage in flexible, temporary, or freelance jobs, often involving connecting with clients or customers through an online platform.

The modern gig economy is often considered to have started in the late 2000s and early 2010s with the advent of platforms such as Uber, Airbnb, TaskRabbit, and others. These platforms facilitated peer-to-peer services and the commodification of personal assets and skills.

The gig economy saw significant growth after the Great Recession of 2007-2009. Economic recovery was slow, and many people turned to freelance work and temporary jobs to supplement their income or as their primary source of employment due to the scarcity of traditional jobs.

The gig economy truly began to thrive in the mid-2010s as technology adoption increased, smartphone use became ubiquitous, and more platforms entered the market. By this time, the gig economy had expanded to include a wide array of industries and job types, from ridesharing and home-sharing to freelance graphic design, writing, and various other professional services.

The concept reached new heights as companies that operated these platforms grew in valuation and global reach, and the term "gig economy" became synonymous with the future of work.

It's important to note that while the gig economy provides flexibility and potentially a variety of income streams for workers, it also raises questions about job security, benefits, and workers' rights, which are ongoing topics of debate among policymakers, businesses, and labor advocates.

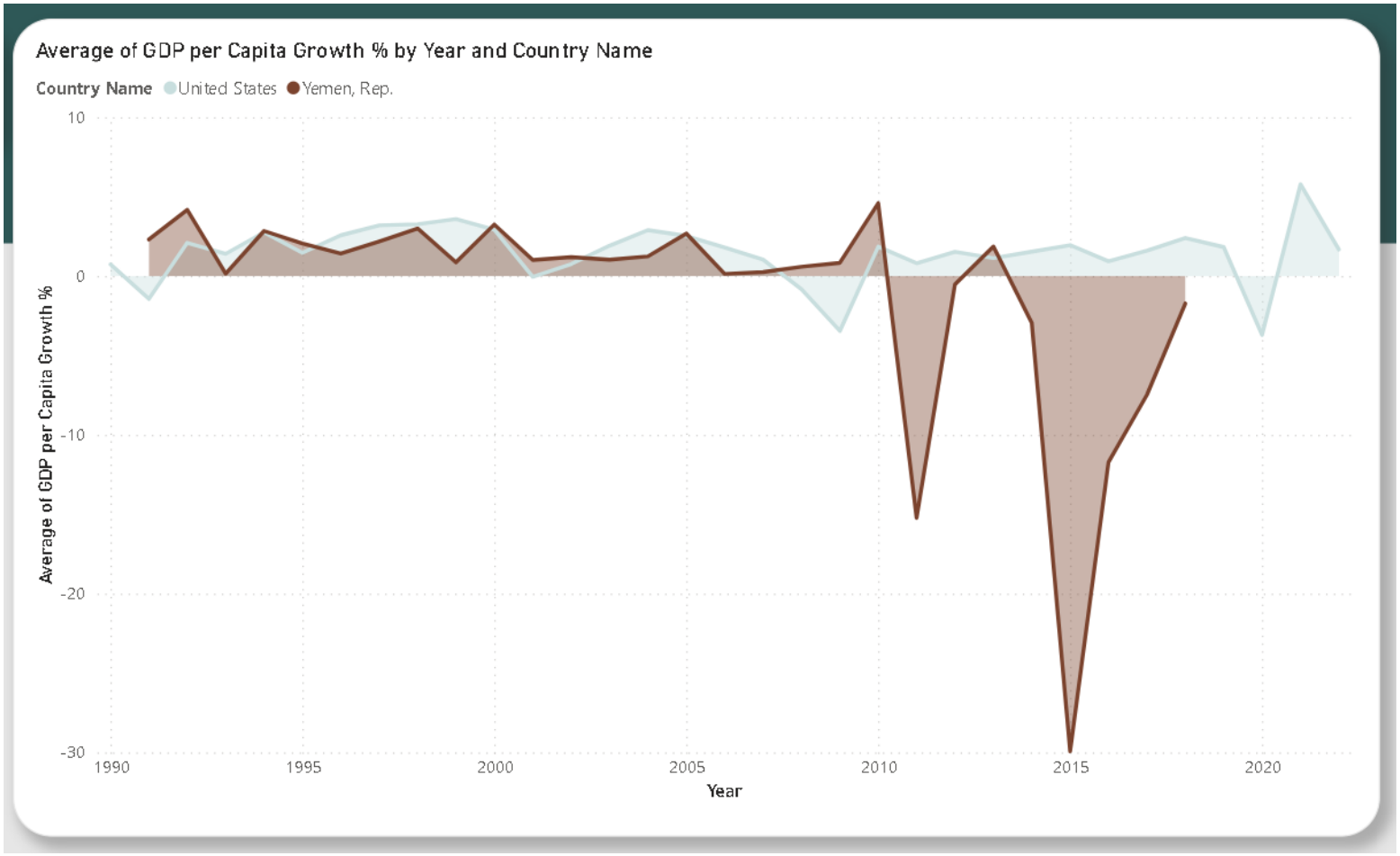
The huge spike after COVID-19 may have been a result from this system. The gig economy experienced a significant surge during and after the coronavirus (COVID-19) pandemic. Several factors contributed to this growth. The economic impact of the pandemic led to layoffs and reduced hours in many traditional sectors. This pushed more people to seek income through gig work, such as delivery services, online freelancing, and virtual assistance.

Regional Outlooks

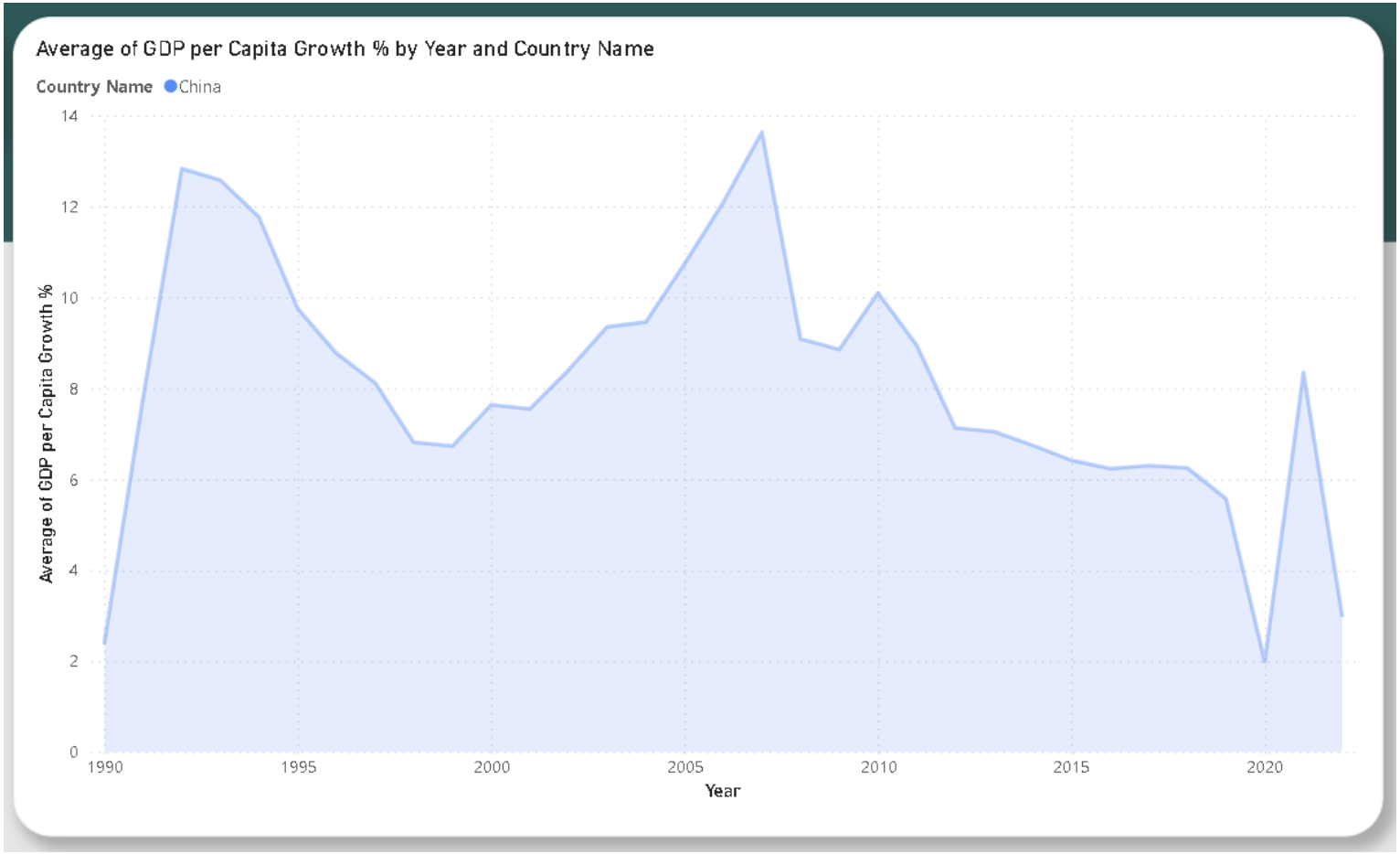
There are many instances in history where new technologies have made things more equal. Often, when new tech comes along, it takes things that used to be just for a few people and makes them available to many. A modern example is mobile phones. Mobile phones have helped level the playing field in developing countries. Aker and Mbiti in 2010 found that mobile phones made it cheaper to communicate and easier to get important information, like farm product prices. This means farmers now know more about what their goods are worth and can do better business with traders. The result is real financial gains, better farming and job markets, and improvements for both the people making and buying goods.

However, there are always ways in which technology and innovation creates inequality, One example being the business-stealing effect. New inventions often replace older products, causing shifts in the economy and changing where jobs are needed. For example, cars replaced horse-drawn carriages in the early 1900s, and we see similar things happening in other areas today. When sectors shrink because of this, it can lead to unemployment and contribute to inequality, especially if workers can't move to growing sectors due to different skill needs. Some experts think that this kind of inequality is just a part of technological progress. Joseph Schumpeter mentioned this back in 1911, saying that entrepreneurs are motivated to innovate because they want the benefits of being ahead in the market, like making more money. In 2013, Mankiw noted that since the 1970s, the richest people, especially the top one percent, have seen their incomes grow much faster than the average. He defends the wealthiest, saying they've helped the economy grow and increased incomes for others too. He questions whether we'd be better off without their contributions, acknowledging that these issues are more about political philosophy than just economics.

This proves to us that GDP per capita is linked to how connected and up to date the country is with technology. The digital divide is a term often used to describe the gap between countries that have easy access to information and communication technology and those that have very limited or no access. Countries that are considered to be further from technology usually face challenges such as poverty, political instability, or lack of infrastructure.



Our area chart above shows us the gap between the United States and Yemen. The United States are deemed to be connected with technology whereas yemen is not connected. The digital divide is more obvious past 2010, this is where technology was booming, and being used by more industries in the world.

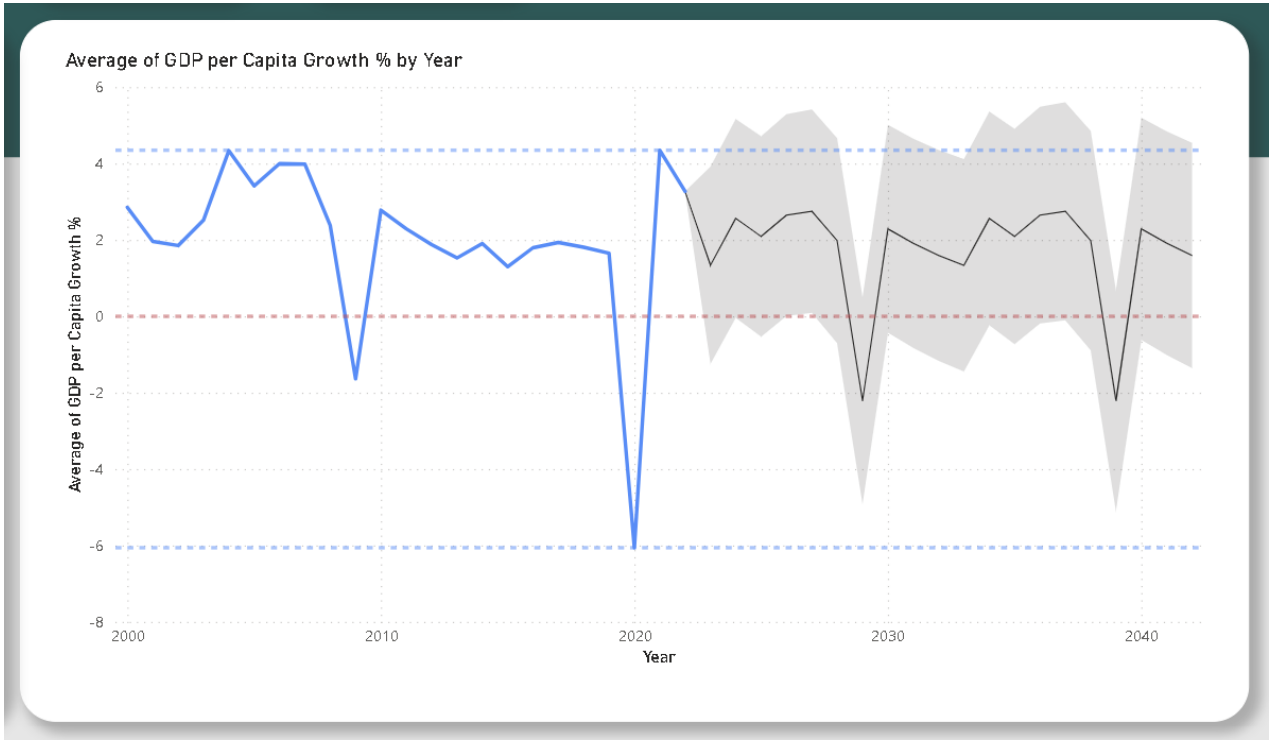


Since the 1990s, China has undergone a remarkable transformation, becoming one of the world's fastest-growing economies, with technology playing a central role in this development. In the early 1990s, China began to lay the foundation for its technological advancement with significant reforms that opened up the economy to foreign investment and privatization. The entry into the World Trade Organization (WTO) in 2001 was a turning point for China. It accelerated integration into the global economy and attracted further foreign investment, including in the technology sector. China began to move up the value chain, from simple manufacturing to more complex and technologically advanced products. By the 2010s,

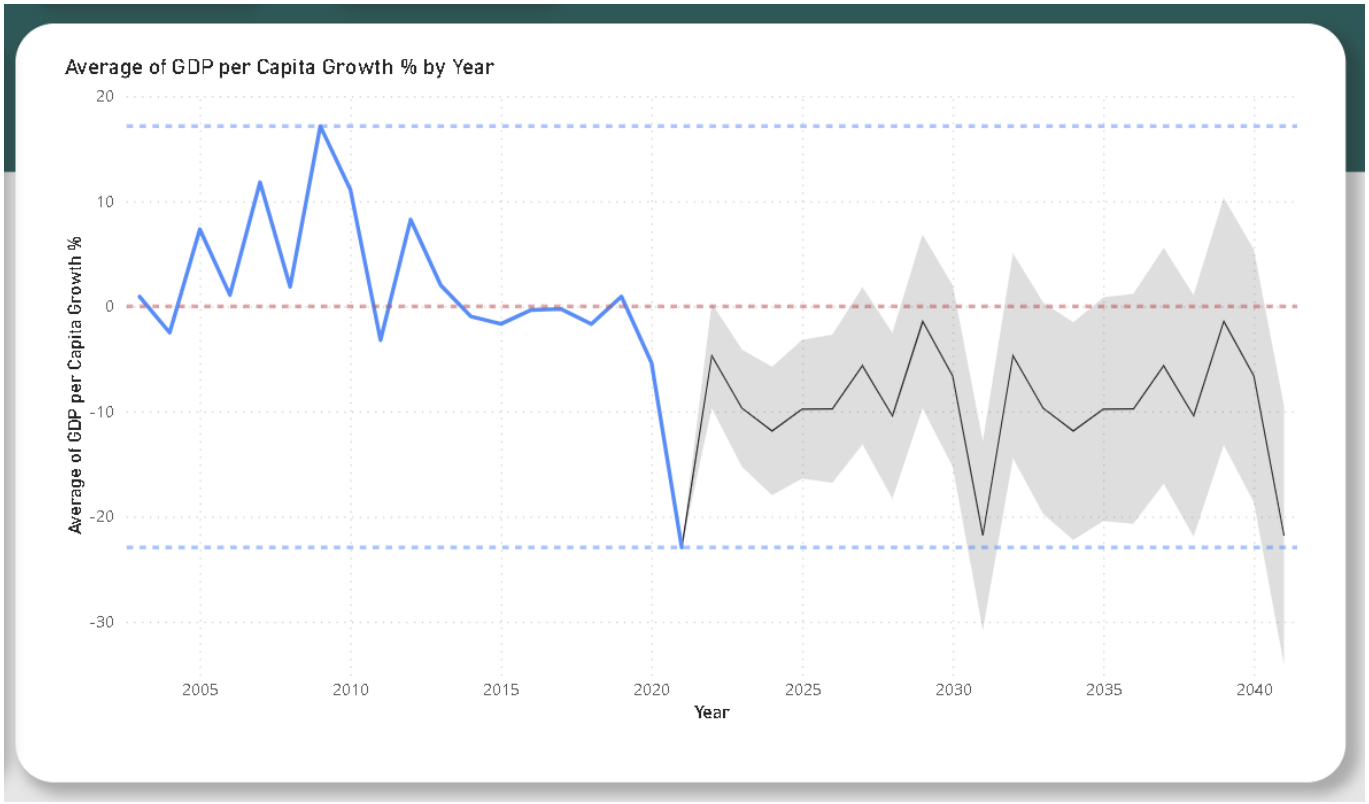
China had become a global powerhouse in technology. Homegrown companies like Alibaba, Tencent, and Huawei became international giants, competing with established players from Silicon Valley. In the late 2010s, China turned its focus to emerging technologies like AI, 5G, and electric vehicles. Massive investments in research and development positioned China as a global leader in these fields.

The interconnection between technology and business industries has been a significant driver of China's economic growth. As these industries have thrived, they've created jobs, increased productivity, and led to higher incomes. The technology sector's contribution to GDP has been substantial, and as a result, China's GDP per capita has seen impressive growth over the decades.

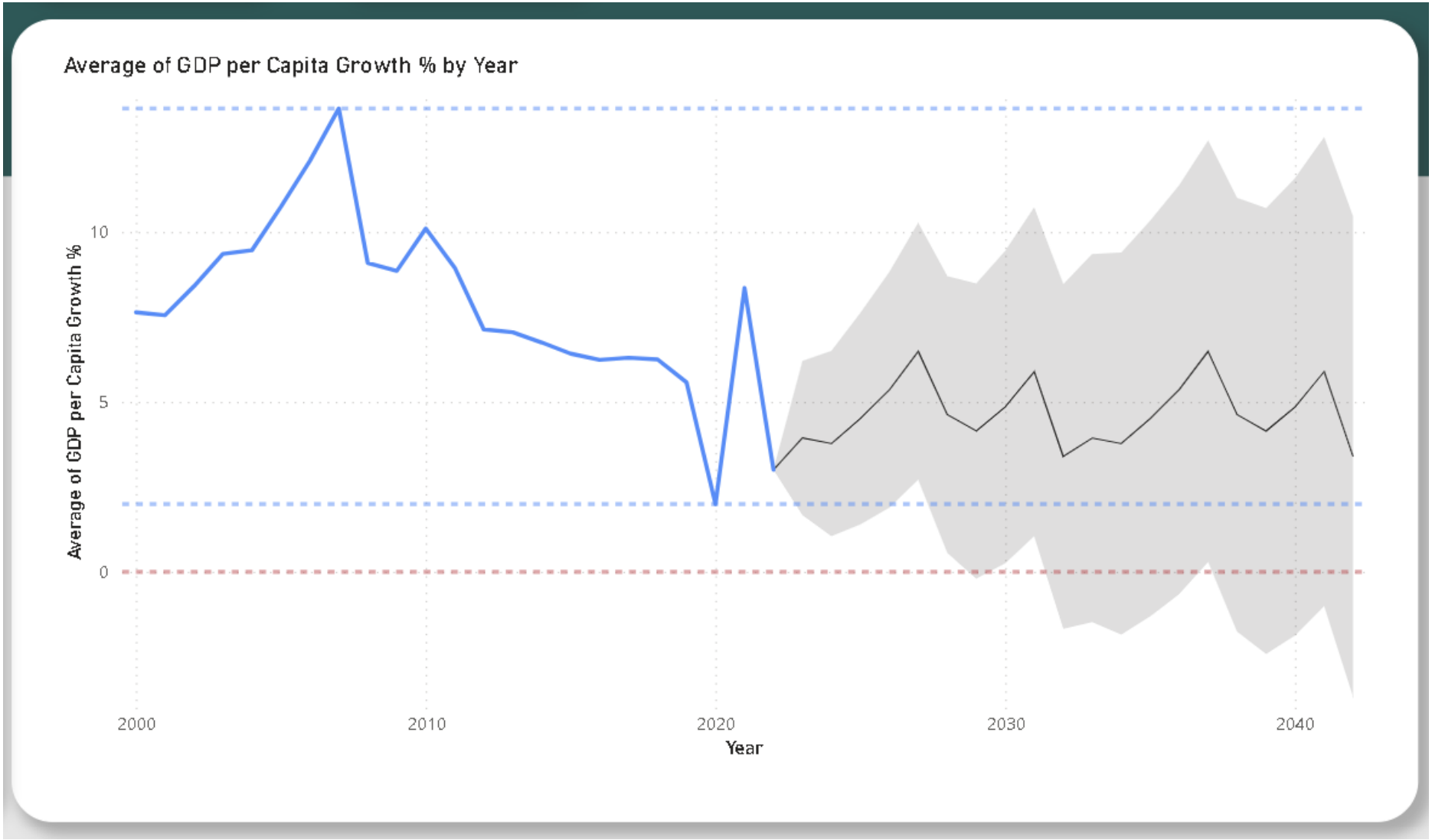
Predictions of Economy and Future Advancements



This graph represents the global economy and gives us a forecast in the next 20 years using the data from 2000.



This graph represents Afghanistan, a country which is not digitally connected



This graph represents China, a country which is digitally connected and provides a forecast in the next 20 years.

Looking towards the future, it's evident that the digital divide will play a pivotal role in shaping global economic landscapes. As technology continues to advance at an unprecedented pace, it stands poised to become a primary engine of GDP growth across the globe. Nations that harness the full potential of technological innovation are likely to see substantial economic gains, widening the gap between the tech-forward and the tech-lagging regions. The ability of countries to adapt to and integrate new technologies will be crucial in determining their economic trajectory. However, this technological march could be tempered by unforeseen natural events, which remain a wildcard in economic forecasting. In the absence of such disruptions, technology's role in economic development is expected to grow increasingly central, potentially redefining wealth and productivity in the decades to come.

Countries with gig economy in place will have the highest growth in GDP

Conclusion

In conclusion, our exploration has illuminated the intricate ways in which technology and GDP are interconnected. The emergence and evolution of technology have been pivotal in driving economic growth, shaping industries, and redefining the workforce. However, the benefits of technological advancements are not distributed evenly, as evidenced by the digital divide that persists between different regions and socio-economic groups. This divide is a significant factor in the global economic narrative, with the potential to both empower and marginalize depending on access, adoption, and the capacity for innovation.

As we stand at the cusp of further technological breakthroughs, the relationship between technology and economic prosperity will undoubtedly intensify. Addressing the digital divide is imperative to ensure inclusive growth and equitable access to the opportunities presented by the digital age. Moving forward, it will be the responsibility of policymakers, industry leaders, and communities to forge pathways that harness technology for the benefit of all, aiming to narrow the gaps that currently exist. In doing so, we can hope to see a future where technology acts not only as a catalyst for economic growth but also as a bridge to greater social and economic equality